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A SYNOPSIS OF THE AWNED GRASSES OF FORMER MADRAS PRESIDENCY

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ABSTRACT

The paper deals with the structure, importance and position of awns in some members of the family *Gramineae*, which is one of the largest families of Angiosperms occurring in the former Madras Presidency. An artificial key for the genera of grasses possessing awns is provided to help easy identification.

INTRODUCTION

The family *Gramineae* is one of the largest families reported in Gamble and Fischer's *Flora of the Presidency of Madras* (1915-1936). Fischer (*l.c.* 1934 & 1936) reported 411 taxa for this family. Since the publication of the flora, 71 more taxa have been added (Karthikeyan, 1971). This brings the total number to 482, of which 19 belong to the subfam. *Bambusoideae* (which has not been considered in this paper). The remaining 463 taxa are distributed under 145 genera.

The present study indicates that out of the total of 145 genera, 83 genera comprising 256 taxa possess awns either from their glumes or lemmas (with rare exceptions), *i.e.*, about 55·3% of grasses available in this area are awned. The remaining 62 genera comprising 207 taxa do not possess awns, their glumes and lemmas being obtuse, acute or acuminate.

AWNS

Awns are slender bristle-like projections from the back or tip of the glumes and lemmas in some grasses. They may either be straight or bent (Hubbard, 1968). Usually, the awns developed from the glumes are straight as in *Echinochloa* and *Oplismenus* whereas those developed from the lemmas are kneed and twisted at the base (*e.g. Arthraxon, Arundinella, Eulalia, Heteropogon,* etc.).

The importance of awns in the classification of grasses is highlighted by the fact that Bor (1958) distinguished *Tripogon pauperculus* Stapf as anomalous in the genus *Tripogon,* for all the species of that genus possess imperfect awns, while the former species only possesses a perfect awn which is kneed and twisted at the base. He, therefore, transferred this species to *Indopoa,* a genus erected by him to accommodate this single species.

A. *Awns from glumes.*

(i) *From lower glume*: The awn is usually solitary and may be shorter than the glume (*e.g. Dactylis, Dinebra, Elytrophorus, Melanocenchris, Myriostachya,* etc.) or much longer than the glume and stout (*e.g. Oplismenus*) or slender (*e.g. Manisuris* and *Perotis*). Rarely the awns may be two and divaricate as in *Manisuris forficulata* C.E.C. Fischer.

(ii) *From upper glume*: The awn may be short (*e.g. Eulaliopsis, Hymenachne, Pseudoraphis,* etc.) or long and slender as in *Pogonatherum* or it may be long and stout as in *Echinochloa* and *Oplismenus.*

B. *Awns from lemmas.*

The family *Gramineae* may be classified into 2 major groups, *viz.*, *Panicoideae* and *Pooideae* based on the structure of the spikelets.

In *Panicoideae* the spikelets contain only 2 florets and the lemmas can be distinguished as upper and lower. The *Panicoideae* are again

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divided into 2 tribes, *viz., Andropogoneae* and *Paniceae.* In *Andropogoneae* the lower lemma is muticous and the upper lemma possesses a perfect awn (rarely muticous as in *Manisuris*). The upper lemma is often well-developed, 2-toothed or -lobed and awned from between the lobes (*e.g. Dimeria, Eulalia, Pogonatherum, Sehima, Thelepogon,* etc.) or if entire then awned from the apex. Occasionally the upper lemma is 2-fid and awned from the middle of the back as in *Spodiopogon,* or 2-fid and awned from the back or from near the base on the dorsal side as in *Arthraxon.* Rarely the upper lemma is reduced to the linear, hyaline stipe of the geniculate awn as in *Bothriochloa, Capillipedium, Dichanthium,* etc. In *Paniceae* the lower lemma is rarely awned, the awns being short as in *Hymenachne* or long as in *Echinochloa* and the upper lemma is muticous.

In *Pooideae,* the spikelets contain 1-many florets and to distinguish between lemmas as lower or upper is not possible. All the lemmas are similar in structure and shape but for sex which may differ. Generally the lowest lemmas are well developed and the uppermost ones are suppressed or occasionally muticous or even reduced to awns (in awned grasses). Often lemmas are 2-fid or entire and awned from the apex or from between the lobes, the lobes being entire or with 2 setae on either side of the awn as in *Jansenella* and some species of *Arundinella.* Occasionally the awns may arise from about the middle of the back of lemma as in *Avena* and *Helictotrichon.* The awns may be sessile or supported by an usually twisted column on the lemma consisting of 3 setae all developed or reduced as in *Aristida.* Rarely the lemmas are awned on the back close to the base as in *Agrostis.* In *Tripogon bromoides* Roem. et Schult. the lemmas are cleft at the apex into 4 lobes with the 2 inner lobes short, awned from between the lobes and the 2 outer lobes with short awns from the sinus. In some grasses like *Myriostachya* the lemmas are continued into short and straight awns.

The study indicates that, of the two groups *viz., Panicoideae* and *Pooideae,* the former contains the major number of awned grasses when compared with the latter. The break-up is as follows:

Name of group	Number of genera	Number of species
Panicoideae :		
Tribes :		
Andropogoneae	33	142
Paniceae	6	13
Pooideae	44	101
Total	83	256

KEY

An artificial key has been provided to help in identification of the genera of awned grasses that occur in this area, *viz.,* former Presidency of Madras constituting the present states of Andhra Pradesh, Kerala, parts of Mysore and Tamil Nadu.

Key to the groups of *Gramineae*

1. Spikelets 2-flowered, falling entire at maturity, usually with the upper floret hermaphrodite and the lower male or barren and if the latter, often reduced to the lemma or rarely the lemma entirely absent, all alike or more often differing in size, shape and structure, frequently dorsally compressed ... *Panicoideae*

1'. Spikelets 1- to many-flowered, breaking up at maturity above the more or less persistent glumes, or if falling entire, then not 2-flowered, with the lower floret male or barren and the upper hermaphrodite, usually more or less laterally compressed or terete ... *Pooideae*

Key to the tribes of *Panicoideae*

1. Spikelets often paired, with one sessile and the other pedicelled, those of each pair similar or more often dissimilar, rarely solitary and all alike ; glumes as long as the spikelet and enclosing the florets, more or less rigid and firmer than the lemmas which are both hyaline or membranous ; upper lemma usually awned ... *Andropogoneae*

1′. Spikelets solitary or paired, more or less similar; glumes usually membranous, the lower usually smaller or sometimes suppressed; lower lemma often resembling the upper glume in texture; upper lemma papery to very tough and rigid, usually awnless ... *Paniceae*

Genera of awned grasses of the tribe *Andropogoneae*

Andropogon
Apluda
Apocopis
Arthraxon
Bothriochloa
Capillipedium
Chrysopogon
Cleistachne
Cymbopogon
Dichanthium
Dimeria
Eremopogon
Eulalia
Eulaliopsis
Heteropogon
Indochloa
Ischaemum
Iseilema
Lophopogon
Manisuris
Microstegium
Miscanthus
Pogonatherum
Pseudanthistiria
Pseudopogonatherum
Pseudosorghum
Schizachyrium
Sehima
Sorghum
Spodiopogon
Thelepogon
Themeda
Vetiveria

KEY

1. Lemmas awned; glumes awned or muticous
2. Glumes muticous
3. Inflorescence not spathed
4. Lower glume of spikelets not prominently nerved
5. Spikelets solitary or binate
6. Spikelets solitary
7. Rhachis of racemes terete, angled or flat, ciliate or puberulous, never rufous-hairy; inflorescence of solitary, twin or fascicled spikes or spiciform racemes; occasionally upper glume awned ... *Dimeria* R. Br.
7′. Rhachis slender, not angled or flat, rufous-hairy; inflorescence a narrow panicle ... *Cleistachne* Benth.
6′. Spikelets binate
8. Pedicelled spikelet well developed
9. One spikelet long- the other short-pedicelled
10. Inflorescence a fan-shaped corymb; rhachis and pedicels slender; callus of spikelets long brown hairy *Miscanthus* Anderss.
10′. Inflorescence of twin, digitate, fascicled or corymbose spiciform racemes; joints and pedicles flattened, stout (lemma muticous in *Ischaemum muticum*) ... *Ischaemum* Linn.
9′. One spikelet sessile, the other pedicelled
11. Inflorescence a solitary raceme (rarely 2)
12. Lower glume of sessile spikelets obtuse or acute, not grooved
13. Racemes terete; pedicelled spikelet curved round the terete, sessile hermaphrodite spikelet; basal callus sharp ... *Heteropogon* Pers.
13′. Racemes not terete; pedicelled spikelet spreading; basal callus rounded ... *Indochloa* Bor
12′. Lower glume of sessile spikelet deeply grooved, 2-toothed or cuspidate ... *Sehima* Forssk.
11 . Inflorescence of digitate, fascicled, corymbose racemes or panicles
14. Upper lemma of sessile spikelets developed
15. Upper lemma 2-fid or -lobed, awned from the sinus
16. Inflorescence of digitate, fascicled, or corymbose racemes
17. Joints and pedicels slender, long ciliate
18. Lower glume of sessile spikelet dorsally longitudinally channelled *Microstegium* Nees
18′. Lower glume of sessile spikelets flat or depressed, not channelled *Eulalia* Kunth
17′. Joints and pedicels flattened or subconcave on the inner side, often stout (rarely muticous as in *Ischaemum muticum*) ... *Ischaemum* Linn.

16′. Inflorescence a panicle ; occasionally the upper glume of the sessile spikelet aristate ; lower glume of sessile spikelet muriculate or with tubercles on the margins ... *Vetiveria* Lem.-Lisanc.

15′. Upper lemma awned from the back, often from just above the base ... *Arthraxon* P. Beauv.

14′. Upper lemma of sessile spikelets reduced to the hyaline base of the awn (occasionally well developed as in *Dichanthium polyptychum*)

19. Inflorescence of digitate, spiciform racemes or, if panicles then strictly divided and branches not capillary

20. Lower glume of sessile spikelets rounded at apex, never pitted .... *Dichanthium* Willemet

20′. Lower glume of sessile spikelets sub-acute, often pitted ... *Bothriochloa* O. Ktze.

19′. Inflorescence a much divided panicle, main rhachis and branches capillary ... *Capillipedium* Stapf

8′. Pedicelled spikelet usually reduced, often to a pedicel (occasionally developed as in some species of *Arthraxon*)

21. Lower glume of sessile spikelets not truncate

22. Upper lemma of sessile spikelet 2-fid or -lobed, awned from the sinus

23. Lower glume of sessile spikelet coriaceous or chartaceous, smooth

24. Spikelets of many pairs in racemes; primary branches often solitary, alternate ; upper lemma of the sessile spikelet cleft for half its length into 2 narrow lobes, awned from the sinus ; decumbent herbs ... *Pseudosorghum* A. Camus

24′. Spikelets of few pairs in racemes ; primary branches verticillate or alternate; upper lemma of the sessile spikelet 2-toothed or -fid or entire, muticous, aristate or awned from the sinus ; erect, occasionally woody herbs ... *Sorghum* Moench

23′. Lower glume of the sessile spikelet thickly coriaceous, transversely strongly ridged, rugose or tubercled ... ... *Thelepogon* Roth ex Roem. & Schult.

22′. Upper lemma awned from the back, often just above the base ... *Arthraxon* P. Beauv.

21′. Lower glume of the sessile spikelet broadly cuneiform, nearly flat, truncate ; spikelets closely imbricate ; racemes solitary or 2-3-nate ... *Apocopis* Nees

5′. Spikelets in threes, one sessile, the other two pedicelled ; glumes of pedicelled spikelets often aristate ; upper lemma of sessile spikelet entire or 2-toothed, awned ... *Chrysopogon* Trin.

4′. Lower glume with 5-9 prominent nerves ; spikelets 2-3-nate, one sessile, the other 1-2-pedicelled ; glumes occasionally aristate ; upper lemma deeply 2-fid, with a long slender awn from the sinus ; panicle at first enclosed in a long spathaceous sheath ; leaves petioled ... *Spodiopogon* Trin.

3′. Inflorescence spathed

25. Basal sheaths glabrous ; inflorescence usually a panicle, rarely solitary, corymbose or digitate racemes (*Andropogon*)

26. Basal pairs of spikelets closely approximate to form an involucre

27. Involucral spikelets sessile, either at the same level or in superposed pairs ... *Themeda* Forssk.

27′. Involucral spikelets pedicelled, all at the same level ... *Iseilema* Andress.

26′. Involucral spikelets absent

28. Basal joint of the raceme not bulbous

29. Joints thickened upwards, toothed at apex

30. Joints stout with a scarious, cupuliform, more or less toothed terminal appendage ; inflorescence of terminal, solitary, spiciform racemes, frequently collected into a false panicle ... *Schizachyrium* Nees

30′. Joints slender, usually 2-3-toothed at apex, densely ciliate on margins ; inflorescence of solitary, paired or corymbose, digitate, spiciform racemes, sometimes forming a false panicle ... *Andropogon* Linn.

29′. Joints not toothed at apex

31. Inflorescence of sub-umbeilate fascicles of racemes, 2-jointed, the basal with one sessile and one pedicelled spikelet, the upper with one sessile and 2-pedicelled spikelets ... *Pseudanthistiria* (Hack.) Hook. f.

31′. Inflorescence of paired racemes, usually one sessile, the other peduncled, collected into a frequently much branched panicle; joints and pedicels of the lowest pairs sometimes swollen (occasionally muticous or imperfectly awned in *Cymbopogon citratus* and *C. nardus*). ... *Cymbopogon* Spreng.

28′. Basal joint of the raceme bulbous; spikelets in threes, 1 sessile and 2 pedicelled; the terminal spikelet small or almost suppressed, on a broad, glume-like pedicel; upper lemma of the sessile spikelet often muticous ... *Apluda* Linn.

25′. Basal sheaths white- or cream-tomentose; raceme solitary; lower glume of sessile spikelet dorsally pitted ... *Eremopogon* .(Hack.) Stapf

2′. Upper glume awned

32. Basal sheaths glabrous

33. Racemes few to many

34. Spikelets binate, both pedicelled; lower glume narrowly truncate, ciliate ... *Pseudopogonatherum* A. Camus

34′. Spikelets binate, one sessile, the other pedicelled; lower glume of the sessile spikelet narrowly obcuneate, 3-toothed or mucronate and lobulate with a tuft of rufous hairs in the middle ... *Lophopogon* Hack.

33′. Raceme solitary; spikelets binate, one sessile, the other pedicelled; joints, pedicels and callus long-ciliate ... *Pogonatherum* P. Beauv.

32′. Basal sheaths woolly; spikelets binate, one sessile, the other pedicelled; callus long brown hairy; lower glume 2-3 toothed, 5-7 nerved, hairy on the back at the base; upper glume cymbiform, 3-5 nerved *Eulaliopsis* Honda

1′. Lemmas muticous; spikelets 2-nate, one sessile, the other pedicelled (often appearing to be sessile due to the fusion of the pedicel with the joint); raceme solitary, terminal; lower glume of the sessile spikelet smooth or rugose, muricate or spinulose, 2-keeled and winged on the upper half, 1-2 awned (muticous in *Manisuris clarkei* and *M. myuros*); rarely upper glume of the pedicelled spikelet awned (*M. forficulata*) ... *Manisuris* Linn.

Genera of awned grasses of the tribe *Paniceae*

Alloteropsis	*Oplismenus*
Echinochloa	*Pseudoraphis*
Hymenachne	*Rhynchelytrum*

KEY

1. Upper lemma muticous; lower lemma muticous or awned; upper glume awned or aristate

2. Lower glume muticous

3. Lower lemma awned

4. Upper glume entire, awned

5. Culms spongy below; inflorescence a thyrsoid panicle, branches erect, appressed ... *Hymenachne* P. Beauv.

5′. Culms tough below; inflorescence of loose panicles of spiciform racemes (glumes and lower lemma acute in *Echinochloa colonum*) ... *Echinochloa* P. Beauv.

4′. Upper glume emarginate or 2-lobed, aristate from the sinus; inflorescence a compound panicle; branches and pedicels capillary, the latter discoid and hairy at the tips; spikelets clothed often with brightly coloured hairs ... *Rhynchelytrum* Nees

3′. Lemmas muticous; spikelets solitary, shortly pedicelled; the branchlets produced beyond the uppermost spikelet; lower glume very small, upper glume aristate; floating or marshy herbs ... *Pseudoraphis* Griff.

2′. Lower glume, upper glume and lower lemma awned; spikelets solitary or fascicled, in simple or panicled spiciform racemes ... *Oplismenus* P. Beauv.

1′. Upper lemma shortly aristate, lower lemma muticous; palea of the lower lemma 2-fid or -partite and that of the upper lemma with basal auricled flaps; margins of upper glume densely ciliate or winged ... *Alloteropsis* J. S. Presl ex C. B. Presl

Genera of awned grasses of the group *Pooideae*

Acrachne
Agrostis
Anthoxanthum
Aristida
Arthrochloa
Arundinella
Arundo
Avena
Brachypodium
Bromus
Chloris
Coelachyrum
Cortaderia
Dactylis
Dactyloctenium
Dichaetaria
Dinebra
Diplachne
Elytrophorus
Enneapogon
Enteropogon
Festuca
Garnotia
Helictotrichon
Hordeum
Hygroryza
Indopoa
Jansenella
Lolium
Lophatherum
Melanocenchris
Myriostachya
Neyraudia
Oryza
Perotis
Phragmites
Polypogon
Pommereulla
Porteresia
Streptogyna
Tetrapogon
Tripogon
Triticum
Vulpia

KEY

1. Spikelets 1-flowered
2. Lemmas awned ; glumes awned or muticous
3. Rhachilla produced beyond the floret
4. Rhachilla produced beyond the lemma into a filiform arista bearing a minute empty glume below the middle ; upper glume subaristate ; lemma bifid at apex with a long recurved awn from the sinus ... *Dichaetaria* Nees ex Steud.
4'. Rhachilla produced beyond the lemma and bearing several closely sheathing cuspidate, empty lemmas ; glumes acute or obtuse ; lowest lemma mucronate or cuspidate ... *Lophatherum* Brongn.
3'. Rhachilla not produced beyond the floret, or if produced then not filiform or aristate
5. Glumes often reduced or absent
6. Glumes minute, subulate, rarely absent
7. Lemma and palea winged above the middle, smooth ; glumes subulate ... *Porteresia* Tateoka
7'. Lemma punctate or granulate, not winged ; glumes oblong or minute ... *Oryza* Linn.
6'. Glumes absent ; culms floating, spongy below ; leaves ovate to narrowly ovate-oblong, subcordate at base ... *Hygroryza* Nees
5'. Glumes well developed
8. Awn of lemma without setae
9. Glumes entire, muticous or awned
10. Glumes muticous ; lemma truncate, crenate or cleft, often awned on the back (muticous in *Agrostis stolonifera*) ... *Agrostis* Linn.
10'. Glumes usually aristate (muticous in *Garnotia courtallensis*) ; lemma awned from the apex (muticous in *G. mutica*) ... *Garnotia* Brongn.
9'. Glumes usually notched, long awned from the sinus ; panicle dense, spiciform or lobed ; spikelets minute ... *Polypogon* Desf.
8'. Awn of lemma usually with 3 setae (occasionally the setae unequal) ; awn often supported by a column ; lemma involute, more or less cylindrical ... *Aristida* Linn.
2'. Lemmas muticous ; glumes tapering into long capillary awns ; awns 2 or more times as long as the glumes ; spikelets subulate ; inflorescence a simple, terminal raceme ... *Perotis* Ait.
1'. Spikelets 2- to many-flowered
11. Lemmas awned ; glumes awned or muticous
12. Inflorescence of plumose panicles ; culms reed-like
13. Spikelets hermaphrodite
14. Rhachilla glabrous
15. Lemmas lanceolate, entire and acuminate or 2-fid with an arista from the sinus, long-silky hairy on the back below the middle ... *Arundo* Linn.
15'. Lemmas elongate-subulate often recurved, entire or shortly 2-fid, with 2 setae and an usually recurved awn from the apex or sinus, sides long-silky hairy ... ... *Neyraudia* Hook. f.
14'. Rhachilla long-hairy, lemmas subulate-lanceolate, aristate ... *Phragmites* Trin.
13'. Spikelets unisexual ; lower glume often 2-toothed ; lemma glabrous in male inflorescence, villous in female ; leaves usually crowded at the base of the culms ... ... *Cortaderia* Stapf

12′. Inflorescence never plumose

16. Grain ventrally grooved ; inflorescence of solitary spikes

17. Spikelets in threes at each node of the rhachis ; central sessile and the lateral pedicelled ; rhachilla jointed below the lemma and produced above as a bristle. occasionally with a reduced lemma ; glumes awned ... *Hordeum* Linn.

17′. Spikelets solitary ; glumes obtuse or shortly awned ... ... *Triticum* Linn.

16′. Grain not ventrally grooved ; inflorescence rarely a solitary spike

18. Ovary with a hairy terminal appendage

19. Inflorescence a spiciform raceme ; spikelets terete ; lemmas more or less entire ... ... *Brachypodium* P. Beauv.

19′. Inflorescence a contracted or effuse panicle ; spikelets laterally compressed ; lemmas 2-fid or lobed ... ... *Bromus* Linn.

18′. Ovary without a terminal appendage

20. Leaf sheaths not auricled

21. Spikelets never cone-shaped

22. Lemmas 1-3-awned

23. Spikelets 2-flowered ; upper floret hermaphrodite ; lower male, barren or hermaphrodite

24. Both glumes shortly awned ; lower lemma shortly aristate ; upper lemma 2-lobed, lobes aristate, bearded at the base of the lobes ; awn from between the lobes with a flat twisted column ; panicle compact, head-like ... ... *Jansenella* Bor

24′. Glumes acute or acuminate ; lower lemma muticous ; upper lemma occasionally lobed, lobes with bristles or not, never bearded at the base ; awned between the lobes or at apex, occasionally muticous ; column of awn not flat ; panicle effuse or contracted ... ... *Arundinella* Raddi

23′. Spikelets few- to many-flowered, often uppermost floret or florets reduced, lower hermaphrodite, rarely reduced

25. Lemmas entire or 2-lobed, awned from the back

26. Lower floret hermaphrodite

27. Glumes 1-5-nerved ; spikelets erect ; perennials ... *Helictotrichon* Bess. ex Roem. & Schult.

27′. Glumes 5-11-nerved ; spikelets nodding ; annuals ... ... *Avena* Linn.

26′. Lower floret male or barren ; panicles spiciform or lax ... ... *Anthoxanthum* Linn.

25′. Lemmas entire or 2- or more-lobed, awned from the apex or from the sinus

28. Glumes toothed or notched at apex

29. Lower glume toothed on one margin

30. Awn of lemma perfect, geniculate, twisted at the base ; lemmas 2-fid at apex ... ... *Indopoa* Bor

30′. Awn imperfect, not geniculate ; lemmas 2-4-fid at apex ... ... *Tripogon* Roem. & Schult.

29′. Glumes usually notched at apex ; lowest lemma truncate or 2-toothed, caudate ; spikes usually in several whorls ... *Acrachne* Wt. & Arn.

28′. Glumes entire, muticous or aristate

31. Lemmas 5-many-nerved

32. Inflorescence a panicle ; lower glume present

33. Panicle never unilateral

34. Panicle contracted ; glumes very unequal, lower 1-nerved, upper 3-nerved ; lemmas subulate-lanceolate, tapering into an awn ; stamen 1 ... *Vulpia* C.C. Gmel.

34′. Panicle contracted or open ; glumes subequal, lower 1-nerved, upper 3-5-nerved ; lemmas lanceolate, muticous, mucronate or awned ; stamens 3 ... ... *Festuca* Linn.

33′. Panicles composed of short, crowded, unilateral spikes, lemmas subaristate ; paleas 2-fid, 2-keeled, keels ciliolate ... *Dactylis* Linn.
32′. Inflorescence of solitary spikes ; rhachis alternately and distichously hollowed opposite the spikelets ; lower glume suppressed excepting in the terminal spikelet ; lemma muticous or awned ... ... *Lolium* Linn.
31′. Lemmas 1-3-nerved
35. Lower or upper or both glumes aristate
36. Spikelets secund in the inflorescence
37. Inflorescence of umbelled or racemosely arranged spikes or spiciform racemes ; spikelets with 1-perfect floret below and 1-3-imperfect florets above ; lemmas obtuse or 2-fid, awned; glumes acuminate or the upper aristate ... ... *Chloris* Sw.
37′. Inflorescence of sessile or shortly peduncled clusters of 4-5 spikelets on a flattened, solitary axis ; florets 2 ; lemmas entire and cuspidate or 3-cuspidate ; rhachilla prolonged beyond the upper lemma and occasionally bearing 1-2 empty scales ; glumes aristate ... *Melanocenchris* Nees
36′. Spikelets not secund
38. Inflorescence of umbellate or racemose spikes or panicles
39. Erect or creeping herbs, not more than 1m high ; spikes umbellate or racemose ; usually upper glume aristate
40. Spikes 1-7, in a terminal umbel, digitately spreading; spikelets densely imbricate, the rhachis prolonged beyond the spikelets as a sharp point ; lemmas mucronate or cuspidate ... *Dactyloctenium* Willd.
40′. Spikes racemose ; spikelets imbricate ; rhachis bearing at its tip an aborted spikelet or glumes or ending abruptly; lemmas awned ... *Arthrochloa* Lorch
39′. Stout, marshy herbs, up to 3 m high, rootstock sometimes floating ; inflorescence a narrow elongated panicle ; glumes awned ... ... *Myriostachya* Hook. f.
38′. Inflorescence of densely crowded globose clusters of spikelets continuous in a cylindric mass, lobed or interrupted, on a simple terminal axis ; florets 3-6, subtended by many empty, aristate glumes ... *Elytrophorus* P. Beauv.
35′. Glumes muticous

41. Lemmas 2-fid or entire

42. Spikes digitate or racemose, rarely solitary ; culms erect or decumbent

43. Spikelets with 1-4 hermaphrodite florets below and 1-3 empty lemmas above

44. Spikes 1-2 ; perfect florets upto 4, empty lemmas muticous ... *Tetrapogon* Desf.

44′. Spikes 3-many ; perfect floret 1 ; empty lemmas awned ... *Chloris* Sw.

43′. Spikelets with 1-3 florets, basal floret usually hermaphrodite, upper male or neuter ; spikes solitary or occasionally twin ... *Enteropogon* Nees

42′. Spikes numerous, congested, often into a globular head-like inflorescence ; lowest lemma cuspidate, densely hairy on the keels and on the 2 lateral nerves below the middle ; paleas hairy on the keels ... ... *Coelachyrum* Hochst. & Nees

41′. Lowest lemma 2-4 toothed, mucronate ; margins of lemmas and paleas hairy ; inflorescence a panicle ... ... *Diplachne* P. Beauv.

22′. Lemmas 9-awned ; inflorescence a panicle ; lemmas 4-5, concave, 9-nerved ; the uppermost lemma reduced to short aristas ; awns plumose, ciliate or scaberulous ... *Enneapogon* Desv. ex P. Beauv.

21′. Spikelets inverted cone-shaped, arranged in a spike ; glumes amplexicaul at the base ; lemmas 5-6, spirally arranged, the 2 lowest flabelliform, embracing the upper, 4-lobed, lobes aristate, awned on the middle of the back ; upper lemmas 3-lobed, middle lobe entire or 2-cuspidate ... ... *Pommereulla* Linn. f.

20′. Leaf sheaths auricled at mouth, leaves petioled with obscure transverse venules ; spike unilateral ; spikelets sub-terete, imbricate ; lower glume truncate and erose at apex, 3-7-nerved to the tip ; upper glume entire or 2-toothed at apex, awned ; lemmas 2-fid and awned from the sinus ... ... *Streptogyna* P. Beauv.

11′. Lemmas muticous ; glumes aristate ; spikes spreading or reflexed, collected in narrow, pyramidal racemes, occasionally panicled ; spikelets with 2-3 florets ; rhachilla produced beyond the uppermost floret and bearing an imperfect lemma ... ... *Dinebra* Jacq.

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